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CONTENTS FOR WEEK OF APRIL 20, 1925. Vol. IV. No. 7.

1. Colombia: Brought Nearer to the World by Seaplane.
2. Wheat a Magic Staff of Life for Montreal.
3. Irkutsk: Important Station on a New Air Route.
4. Sub-land Travel, Old and New.
5. Newcastle: Coal Town Since 1200.

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INSPECTING CHICAGO'S FREIGHT TUNNELS

(See Bulletin No. 4)

HOW TO OBTAIN THE BULLETIN

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Colombia: Brought Nearer to the World by Seaplane

ESTABLISHMENT of a seaplane service from Barranquilla to Bogota, capital of Colombia, has about the same importance to this South American nation as completion of the first transcontinental railroad had to the United States. Bogota, instead of being a two weeks' journey from the Caribbean coast is now but a day or so away.

Colombia, which occupies the northwestern corner of South America and forms the southern "abutment" of the Isthmus of Panama, is typical of the entire northern and northwestern portion of the South American continent. It is tremendously rich in all sorts of natural resources, and almost wholly undeveloped.

It has an area of nearly half a million square miles, which means that it is almost twice the size of Texas; yet it has less than one-twentieth of the railroad mileage of that State. To put it differently, there is a mile of railway in the United States as a whole for every 13½ square miles of area, while in Colombia there is only a mile of railway for every 600 square miles of area. Most of the Colombian railways are of narrower gauge, by a foot or more, than those of the United States. They do not form a system but for the most part are in lengths of 25 to 100 miles, scattered about the country.

Millions of Cattle Could Thrive There

Bogota, the capital of Colombia, is situated on a plateau, between ranges of the Andes, at an elevation of more than a mile and a half. It is approximately 450 miles from the Caribbean Sea along the most accessible route, and 200 miles from the Pacific across the Andes. It has no rail connection with either sea. To reach it before the seaplane came one had to travel more than 500 miles up the winding course of the Magdalena River by boat, skirting rapids by means of a short length of railroad, and finally cover the last 50 miles from the head of navigation by rail. Transportation of supplies throughout much of the interior is by means of mule back along rough, narrow mountain paths. The few carriage roads are in the Magdalena delta near the coast and in the vicinity of Bogota on the plateau.

More than half of the area of Colombia lies east of the three ranges of the Andes and consists of plains country sloping toward the center of the continent and drained by the headwaters of the great Amazon and Orinoco river systems. Covered with succulent grasses, these plains form an unsurpassed stock-raising country. It is largely unutilized and is to be compared with the plains of Rhodesia, South Africa, as one of the richest unoccupied regions suitable for cattle raising remaining in the world. It is estimated that more than ten million head of cattle could be pastured on these "llanos" of eastern Colombia.

Colombia's climatic conditions vary from the sub-tropical, near the shores of the Caribbean, to Alpine in the higher Andes. Forests cover millions of acres, the deltas and river valleys yield cotton, tobacco, cacao, bananas, rubber and other tropical and sub-tropical products, while on the hillsides coffee thrives. On the plateaus grain and other temperate zone products may be grown. The need for railroads in Colombia is indicated by the fact that, though considerable

UMI

PETRIFIED TREE STUMP IN THE CORK AND BOTTLE MINE; SCRANTON, PA.

This is a paragraph from the chapter on carbon in the great Book of Nature. It is a volume compressed into a sentence in picturing the story of the formation of the coal we burn. Could every pupil go down into a deep mine and there read the painstaking processes by which a bountiful Mother Nature so richly provided for us, there would be a fuller appreciation of the genial miracle-working heat which is coaxed from coal (see Bulletin No. 5).

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Wheat a Magic Staff of Life for Montreal

FOR THE fourth successive year Montreal announces its supremacy as the greatest wheat exporting city in North America. So great is the yellow flow through Montreal, that its shipments abroad exceeded the combined exports of its seven chief rivals in the United States: New York, Galveston, New Orleans, Philadelphia, Baltimore, Norfolk and Boston through the major shipping season last year.

The staff of life has been a magic wand for the Canadian metropolis. Waving it, Montreal raises another skyscraper on her water front. Take an elevator to the 15th floor of No. 1, St. Lawrence River, Montreal's chief wheat "office," look out a window to the west, and the story of Montreal and its part in supplying that grain lies revealed.

Ten Acres of Wheat Per Minute

At one's feet an ocean liner rests snugly against a wharf, beside a long gallery which sprouts below like a root of the skyscraper itself. Within that gallery huge, wide, running belts are man-made creek beds for a stream bank-full of wheat. The liner is receiving in its hold the product of more than 10 acres of wheat land every minute.

Close under the protecting shadow of the liner lies a smaller steamship. It has lines like a German dachshund; much open deck lies between the superstructures fore and aft. Beneath the hatches which cut the deck into a gridiron is more yellow wheat from Port Colborne, Ontario, waiting to be stored in the grain elevator. In the open water of this harbor sector fretting tugs line up at appointed places like cavalry horses. Now and then with a snort of white steam and a puff of black smoke they dart from their "company front" on double quick to push some ocean leviathan in or out of its berth.

The Neck of the Grain Bottle

At the right of the tug line is the main neck of North America's wheat bottle, the end of the Lachine Canal. Montreal is the queen of wheat ports and more than 60 per cent of her "yellow gold" comes down the St. Lawrence by water. Over to the left the sun catches the glint of white water on the Lachine rapids, head of navigation of the 1,000-mile Nature-made channel which is this bottle's mouth. Braving the rapids is the spidery black line of the Victoria Bridge with trains shunting across it almost constantly. To the right, under wooded Mount Royal is the city, founded by Chevalier Maisonneuve, but built by wheat.

Westward the canal and railroad blend with the smoky mist through which one seems to see the winding miles of river, the blue of the Great Lakes and the breadth of the valleys of the Red River and Mississippi—flat plains where the sky is a cover pressed to earth at the horizon and wheat is the filling between the crusts. Whether Montreal lives or dies depends on Manitoba, Saskatchewan, Minnesota and the Dakotas where winter white gives way to green in spring, golden in summer, brown stubble in fall and back to white again.

Assume out there a farm where nothing but wheat grew, where there were

UMI

quantities of grain are produced on the interior plateaus, it has always been cheaper to buy grain from the United States in the Colombian coast cities after it has been shipped thousands of miles, than to transport the domestic grain the few hundred miles from its place of production.

Gold has always been one of the important products of Colombia. Since the coming of the Spaniards at the beginning of the sixteenth century approximately $700,000,000 worth of gold, it is estimated, has been mined from the country. Between $5,000,000 and $6,000,000 worth is produced annually at present. Platinum, iron ore and numerous other minerals are present in quantities that reward developers richly.

Has "Mt. Vernon of South America"

Colombia was named for Christopher Columbus who, in 1502, started in the country, where the Isthmus of Panama meets South America, the first settlement on the mainland in the New World. This settlement was short-lived. Carthagena, one of the chief ports, was established in 1533. It was heavily fortified by the Spaniards and served as the collection point and place of safe keeping for the treasure from both coasts of South America preliminary to its periodical shipment to Spain under convoy.

After independence was won from Spain in 1819 Colombia was combined with Venezuela and Ecuador as "the Republic of Colombia." Later there was a separation and Colombia became by turns the "Republic of New Granada," "the Confederation of Granadina," "the United States of Colombia," and finally in 1886 again "the Republic of Colombia." Bolivar, the South American patriot leader, though born in Venezuela, lead the Colombians to liberty and became the first president of the republic. He was banished from Venezuela and retired to a country house in Colombia near Santa Marta. His home, "the Mount Vernon of South America," is today a shrine in which are preserved many relics associated with his battles and political triumphs.

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ONE WAY OF CROSSING THE ANDES IN COLOMBIA

The sheeted packs are really chairs and contain a mother and her two children. The passenger faces to the rear. These chairs are lightly but strongly made, with a hoop, like the "bow" of a "prairie schooner's" top, above the seat, over which a sheet is thrown to protect the occupant. The bearers travel at the same rate as pack-mules, approximately three miles an hour (see Bulletin No. 1).

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Irkutsk: Important Station on a New Air Route

IRKUTSK, in mid-Siberia, will be one of the principal stop-off points for the proposed sea-to-sea flight over Asia planned by the Japanese for the coming summer. Japan's aviators expect to blaze a new air trail across Asia and Europe flying from Tokyo to London.

Irkutsk is forty hours from anywhere, figuratively, and five days from Petrograd, literally, in the best of times. It is farther, in fact, from the Russian capital than is San Francisco from New York.

Not only is Irkutsk a remote city of a sleeping giant country, but it has been an isolation ward for Russia's political exiles. From such a thistle the traveler usually did not expect much—and was agreeably surprised. Before the war Irkutsk was a thriving, well-built, modern city.

City Has All Modern Equipments

In 1879, a great fire did irreparable damage to archives contained in museum, library, government buildings, and the Siberian branch of the Russian Geographical Society. But, in rebuilding, Irkutsk was the Baltimore of Siberia, and it became noted for its churches, orphanages, hospitals, schools, observatories, and museums. It is a city of imposing buildings, beautiful homes, and is given to lavish hospitality, while its extended business operations are supplemented by all modern municipal equipments, including telephony and efficient fire service.

Irkutsk is capital of a province of the same name which has a million people. The city's normal population is about that of Omaha, Nebraska. Lake Baikal's southwestern shores are but 44 miles east of the city, which is on the right bank of the Angara River. Thus Baikal, deepest lake in the world, and largest, except for our own Great Lakes and Victoria Nyanza and Tanganyika, in Africa, with its five contributory rivers, affords unusual inland transportation facilities. The Angara, a principal outlet of the lake, leads to the Yenisei River Basin, with its 10,000 miles of navigable waterway.

Fur Trading Station at First

Irkutsk had its beginning from the station established there in 1652 for collection of a fur tax from the Buriats. This curious people still dwell in the Baikal Lake region. In them, it would seem, the ethnological east and west almost meet. Their business is akin to that of the herdsmen of our own western plains; in appearance they resemble the Chinese. In winter they dress like Eskimos, with sheepskins and furs; their summer attire is the Oriental gown of silk and cotton.

The horses the Buriats raise figure in the religion they cling to most tenaciously. This religion calls for sacrifice of the favorite steed at the owner's grave. The less faithful among the heirs, though, have been known to tie an animal with a tether so frayed that the horse soon broke away to join the herd.

UMI

no houses, no trees, no waste land—just wheat. If it produced on an average of 15 bushels to the acre that farm would have to be half as large as Indiana to raise enough wheat to satisfy Montreal's shipping demands for the past year.

The Argosy of Wheat

A Montreal grain elevator works from the top down. As soon as a boat or train is emptied the wheat goes by conveyors to the top, finding lodging in huge bins. On the next floor below it is weighed. Stationed at a battery of huge containers, dusty workmen let in a flood of wheat from above. They can estimate a ton to a fraction of a pound. Released by a lever, the grain falls a floor to a five-foot moving belt. Almost before it can settle down to a pleasant ride it reaches a big steel cart on rails which precipitately dumps it into what looks like a bottomless pit, but isn't. Later the wheat will emerge from the pit for another belt ride, through galleries stretching a mile and a quarter along the water front, to be dumped summarily into an ocean liner or tramp.

Receiving grain is more complicated than dispatching it. At Duluth or Port Arthur or Fort William big lake freighters take wheat from box cars and bring it to Port Colborne, at the head of the Wellington Canal, or to Buffalo or Cleveland if it goes out through the United States. At Port Colborne steamers that can just squeeze through the locks of the St. Lawrence canals, take on the wheat. At Montreal, finally, huge bucket conveyors are lowered from the elevator through the hatches and start the grain to the skyscraper's top. As grain in the ship's hold gets low, men with huge steel scoops go in. A rope is attached to each scoop and when the workman has dug it into a pile of grain a winch on signal drags it up to the conveyor snout, filling the moving buckets with grain. Four lake steamer loads, or a train of 116 cars of grain, are required to fill an average ocean tramp.

Toying With Freight Cars

Automatic car dumpers have been installed in some Montreal elevators. Picking up a loaded car like a toy, they push in the door, tip the car on its side, emptying the wheat into a pit and set it back on its wheels at the rate of one box car in a little less than ten minutes.

Farmers should never go to grain elevators. Confidence that one's efforts are doing something for the world is a handmaiden to happiness. Back in Minnesota two hundred acres of waving wheat inspire pride in a farmer's heart but they do not cut much of a figure in Montreal. If the farmer came to the Canadian metropolis he could view the arrival of his year's effort and worry in one box car and one half of another, or in a small corner of a lake steamer. It would be unloaded from either conveyance in less than twenty minutes.

Where a Bushel Isn't Much

In the top of the grain "skyscraper" he would see his 200 acres of wheat dumped into a bin which would still be nine-tenths empty. Yet there may be a hundred more bins in this honeycomb called a grain elevator. Could he still stand the strain he might watch his wheat drop into the hold of a liner in about 12 minutes. Wheat must move fast at the neck of the bottle and faster yet when ice corks the neck between December and May and so Montreal is capital of wheat—and of agrarian humility.

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Sub-land Travel, Old and New

NEW YORKERS in planning extensions of their subway system are really practicing one of the most ancient arts of communication.

Sub-sea and aerial travel are comparatively recent; sub-land communication, which is infinitely harder to achieve but involves less scientific knowledge, is as ancient as the Egyptians and American Indians.

Though modern tunnel projects make the laymen gasp at the audacity with which engineers burrow through age-old mountains, unmindful of seemingly impossible barriers, tunneling has been known since very early times.

Alps Tunnel on Napoleon's Route

Egyptians, Numidians and American Indians hollowed out underground passages to their tombs or temples, and early inhabitants on the Euphrates temporarily diverted the waters of that mighty river while they bored into the soft ground beneath the river and walled up the passage with brick masonry. The Romans had more pretentious ideas and excavated a 3,000-foot passage through the Posilipo hills, near Naples.

Human moles have made tracks through the rock-ribbed bases of the proud Alps. The second passage of the Simplon Tunnel, the longest in the world, was opened to tourist traffic early in 1922. This gave an opportunity for repairing its twin, which had, since its opening in 1905, borne the burden of the travel between France and Italy through Switzerland. Above the roof of this tunnel, the 12¼ miles of which constitute the longest railway tunnel in the world, rises the Simplon Pass. Napoleon saw the strategic importance of this pass and caused the present carriage road to be built over it.

The Route of 50 Tunnels

The Simplon tunnel was designed with a double passage, each section of which measures 16½ feet wide. One interesting feature of the tunnel is that it is straight throughout except for short curves at the ends where the tracks through it join those on the outside. The trains, driven by electricity, pass through it in about 25 minutes.

One of the most interesting railroad lines through the Alps is the Gotthard line with its fifty tunnels connecting Switzerland and Italy. The St. Gotthard tunnel, which is between nine and ten miles long, is older than the Simplon. The chief point of difference between the two is in the grade. The Simplon is driven at much lower altitude and consequently can be used for express service and can carry freight at a much lower figure. The air in the Gotthard Tunnel is fresh and free from smoke.

Longest Mining Tunnel in the World

Since the building of these and other tunnels through the Alps, the famous old passes which have figured so conspicuously in history are becoming less frequented. Romance still clings to Mont Genevre, probably crossed by

UMI

On Trans-Siberian Route

Irkutsk is on the Trans-Siberian railway, a little more than five days' journey east of Moscow in peace times.

The Cathedral of the Virgin of Kazan is one of the most conspicuous buildings in Irkutsk, its five domes and detached belfry immediately attracting the eye of the visitor.

One of the peculiar customs which the traveler encountered at Irkutsk before the war was the closing of the railway ticket office for the sale of tickets two days prior to the departure of a train. He could never decide to take a trip to Petrograd (3792 miles), to Moscow (3384 miles) or to Vladivostock (2008 miles) "on the spur of the moment."

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A SIBERIAN REINDEER WITH A TWO-DAYS-OLD CALF

Siberian natives find the reindeer a serviceable animal, providing food, drink, and transportation. Well-fed deer have been known to cover 100 miles in a day. In riding a reindeer the native places the saddle, not on the back, which would cripple the animal, but on the shoulders. The rider gains his seat by means of a pole and keeps it by a swinging motion, balancing himself with the pole (see Bulletin No. 3).

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Newcastle: Coal Town Since 1200

REPORTS OF a disaster in a coal mine in the Newcastle district, England, echo a similar calamity in the West Virginia coal fields. While West Virginia is well known for its coal in the United States, Newcastle is famous the world over for coal. There are two reasons for this; first, it is a great exporter of coal and second, it has been mining coal since the 13th century.

Lying almost directly across the North Sea from the mouth of the Skagerrack, and strategically located with reference to Norwegian, Danish, German and Dutch ports, Newcastle grew up with a sort of commercial silver spoon in its mouth. The mouth of the Tyne on which the city lies makes an excellent port, and huge deposits of coal underlie the region, so that in growing to be a great industrial and commercial center the city merely followed the easiest path. Newcastle is situated about ten miles up the Tyne and for almost the entire distance to the sea both banks of the river are lined with quays, docks and factories.

Found "Black Stones" Would Burn

A familiar English proverb has firmly linked Newcastle with coal, and it is no surprise to the traveler who ascends the Tyne to see scores of smudgy barges as well as numerous ocean-going ships taking on their black cargoes. The Britons are believed to have been the first people of Europe to discover that certain "black stones" would burn, and it is probable that this discovery was made in the Newcastle region.

Newcastle's name casts a fascinating side light on the relativity of time. The "new castle" whose erection gave the spot its present designation was built in 1172 and is now a weatherbeaten old pile partly in ruins. The city owns the "new castle" and maintains in it a museum of antiquities. Before this historic building boom gave Newcastle a new spurt and a new name it was known as Monkchester. It first came into existence as a Roman bridge-head in the days of Emperor Hadrian—Pons Aelii was its appellation then—and its fortifications guarded the eastern end of the wall erected by his legions.

Birthplace of the Railway

George Stephenson was born there. The old colliery roads with wooden and steel-shod rails, on which horses pulled carts, set him to thinking and he built a locomotive to take the place of the animals. With such a start Newcastle has become an important locomotive building center. Shipyards, ordnance factories, general steel and iron mills, chemical works, and the other industries that always cluster about a center of cheap coal, have also helped build Newcastle. The city has a population of about 280,000.

Newcastle has a number of well-preserved Elizabethan houses which give it a quaint old touch, but it is predominantly a city of fairly modern construc-

UMI

Hannibal and surely by Caesar in 58 B. C. and to Mont Cenis, which heard the tread of the Frankish kings as they marched into Lombardy. Then there are the Little St. Bernard which Caesar also used, and the Great St. Bernard, famous for its hospice founded in 859, and refounded in the eleventh century by St. Bernard of Menthon, which gave succor to the lost and needy among the thousands of pilgrims who were on their way to Rome.

When the miners in the Cripple Creek gold districts found that they must dig deeper into the earth for the precious metal, water poured in upon them and hampered their operations. Pumps failed to relieve the situation, so heads got together and it was decided that a tunnel must be built. Thus the Roosevelt Deep Drainage Tunnel, one of the longest mining tunnels in the world, which was completed in 1921, came into being.

On the Toulouse to Barcelona railway, through the Pyrenees Mountains, there are ten short tunnels in the region of the Ariege gorge, the longest of which is in the form of a spiral in order to effect a climb of 207 feet up the mountain. There is also an international tunnel on the Paris to Madrid route which passes 2,526 feet below the peak of Tobasso.

The New Zealand Alps have since 1907 been holding out against the engineers who have dared to try to burrow beneath them, but the provinces of Canterbury and Westland are now connected by rail through a tunnel which will long stand as one of the greatest undertakings of its kind the Southern Hemisphere can boast.

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tion. One street stands out markedly in contrast to the architectural hodge-podges of most cities. It is Grey Street, the buildings of which are entirely of Grecian architecture. Most ships in the British-Norwegian service make Newcastle the sole or the principal port of call in Great Britain. In the summer thousands of tourists bound for Norway and Sweden pass through the city.

BUSHELS OF WHEAT GOING UP IN SMOKE IN A CHICAGO ELEVATOR FIRE

Several disastrous dust explosions have taken place in grain elevators. One in South Chicago virtually blew the top off a huge concrete structure. In the newest Montreal elevators special precautions against dust explosions have been taken. The dusty miller is dusty no longer in the age of modern machinery and the elevator worker is also free from clouds of particles (see Bulletin No. 2).